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## The challenge of combining initialised and uninitialised decadal projections

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During the past 10 years or so, exploratory work in initialised decadal climate prediction, using global climate models started from recent analyses of observations, has grown into a coordinated international programme that contributes to IPCC assessments. At the same time, countries have continued to develop and update their national climate change scenarios. These typically cover the full 21<sup>st</sup> century, including the initial decade that overlaps with the latest initialised forecasts. To date, however, national scenarios continue to be based exclusively on long-term (uninitialised) climate change simulations, with initialised information regarded as a separate stream of information.

We will use early results from the latest UK national scenarios (UKCP), and the latest CMIP6 initialised predictions, to illustrate the potential and challenges associated with the notion of combining both streams of information. This involves assessing the effects of initialisation on predictability and uncertainty (as indicated, for example, by the skill of ensemble-mean forecasts and the spread amongst constituent ensemble members). Here, a particular challenge involves interpretation of the “signal-to-noise” problem, in which ensemble-mean skill can sometimes be found which is larger than would be expected on the basis of the ensemble spread. In addition to initialisation, we will also emphasise the importance of understanding how the assessment of climate risks depends on other features of prediction system design, including the sampling of model uncertainties and the simulation of internal climate variability.